

Abstract

The main objective of this thesis is to inspect the abilities of the Ising model to exhibit selected statistical properties, or stylized facts, that are common to a wide range of financial assets. The investigated properties are heteroskedasticity of returns, rapidly decaying linear autocorrelation, volatility clustering, heavy tails, negative skewness and non-Gaussianity of the return distribution. In the first part of the thesis, we test the presence of these stylized facts in S&P 500 daily returns over the last 30 years. The main part of the thesis is dedicated to the Ising model-based simulations and to discussion of the results. New features such as Poisson process governed lag or magnetisation dependent trading activity are incorporated in the model. We conclude that the Ising model is able to convincingly replicate most of the examined statistical properties while even more satisfactory results can be obtained with appropriate tuning.